

barrier or mask 30 also engages the encapsulant barrier or can 28 surrounding the assembly. In another embodiment (Fig. 5), the "protective barrier" is in the form of an encapsulant dam 44 which is also mounted to the top surface of the flexible layer, i.e., the surface bearing terminals 26. By the present amendment, claim 1 has been clarified to state that the protective barrier is provided "in contact with said top layer." This change is believed properly enterable under Rule 116. It does not create any new issue. This feature was believed implicit in claim 1 as filed. Moreover, originally presented claims (e.g., claims 20 and 22) express the same thought in narrower terms specific to individual embodiments. Thus, claim 20 as originally filed, stated that "said barrier includes a dam extending upwardly from said top surface" (e.g., 44, Fig. 5) whereas claim 22 as originally filed called for the step of attaching the "mask" (e.g., 30, Figs. 1-3, 7 and 9) constituting the barrier "to said top surface of said top layer . . ."

Claims 1-4, 6-10, 17, 18, 20-27, 30-35 and 48-52 were rejected under 35 U.S.C. § 102(b) as assertedly anticipated by Khandros et al., U.S. Patent 5,148,265 ("Khandros '265"). Claims 48-52 have been cancelled and the rejection of these claims is accordingly believed moot.¹

As discussed at the interview, claim 1 distinguishes over Khandros in that claim 1 recites the step of "providing a protective barrier in contact with said top layer for protecting the terminals on the top layer from an encapsulation material." In the interview, the Examiner referred to elements 36 and 136 of Khandros as possibly constituting a protective barrier. That construction of the reference is respectfully traversed. Element 36 in Khandros' Fig. 3 is the "sheetlike dielectric interposer" which includes the "flexible top layer 38" (col. 9, lines 48-51). Thus, in the terms of present claim 1, element 36 (or top layer 38 incorporated therein) is part of the "semiconductor chip assembly" referred to in the first paragraph of the claim and includes the "top layer" 38 with the terminals thereon (terminals, element 48 in Fig. 3). Clearly, the interposer 36 and the top layer 38

¹ At page 2 of the Official Action, the rejection refers to claims "48-62;" this is believed to be clearly a typographical error as only claims 1-52 are pending.

incorporated thereon are not a separate protective barrier provided "in contact with said top layer;" they are the top layer itself. Moreover, although Khandros Fig. 3 does indeed encapsulate this assembly, with a "low elastic modulus dielectric encapsulant . . . 58" (reference Fig. 4) the terminals are not protected by any "protective barrier" during this process. Instead, Khandros '265 either applies the encapsulant using a "selective coating process such as silk screening" or, as illustrated, by covering the "entire assembly," (including the terminals) and then etching the encapsulant to form holes in alignment with the terminals. The embodiment of Khandros Fig. 3 does not utilize the step of providing "a protective barrier in contact with said top layer" (i.e., in contact with the layer bearing exposed terminals. Even more clearly, the embodiment of Khandros Fig. 3 does not anticipate the more specific arrangements of claim 20 (present Fig. 5) in which a barrier is provided as "a dam [e.g., 40] extending upwardly from said top surface" or present claim 22 (e.g., present Figs. 1-3, 7 and 9) in which the protective barrier includes a "sheetlike mask [e.g., 30]" which extends over the "encapsulation area" i.e, over the space between the assembly and the encapsulant barrier such as the can 28 (Fig. 1) or ring 42 (Fig 3).

In the interview, the alternate embodiment of Khandros (Khandros Fig. 7) and column 14, line 19 - column 15, line 4 was also discussed. As pointed out in the interview, however, this embodiment of Khandros '265 does not involve encapsulation of a semiconductor chip layer which has "a top layer with an array of exposed terminals thereon." Rather, the terminals 148 are disposed on the undersurface of top layer 138. At the time encapsulant 158 is applied, there are no exposed terminals to be protected. Rather, after application of encapsulant 158, radiant energy source 159 is used to punch holes 160 in top layer 138, thereby exposing the terminals. Clearly, this embodiment of Khandros '265 has no need for, and does not include, the separate step of providing "a protective barrier in contact with said top layer." No such "protective barrier" is shown in Fig. 7 and the same would be unnecessary as there are no "exposed terminals" to be protected from the encapsulant. For the same reasons, this embodiment of the reference fails to teach applicants upwardly extending dam (present claim 20) or applicants' sheetlike mask attached to "said

top surface of said top layer and to said encapsulant barrier such that said mask extends over said encapsulation area" (present claim 22) and present Figs. 1-3, 7 and 9. Yet another embodiment of Khandros '265, relied upon in the alternative is described at column 17, lines 21-44 of the reference. In that alternative embodiment, the compliant layer between the flexible sheetlike interposer and the interposer flexible top layer 338 (Fig. 9) is formed by molding, i.e., by introducing an encapsulant under pressure. Here again, however, nothing in the reference has been pointed out as disclosing the step of providing a "protective barrier in contact with said top layer . . ." The statement in the Official Action that the "mold and interposer" correspond to the "encapsulation barrier" and "protective barrier," respectively, is believed incorrect. Here again, the interposer in the reference structure corresponds to the "top layer" of the semiconductor chip assembly referred to in claim 1. Nothing in this embodiment is seen as meeting applicants' separate step of providing the protective barrier in contact with this top layer as recited in claim 1. Moreover, nothing in this embodiment of the Khandros '265 reference is seen as teaching the specific step of providing a dam extending upwardly from the top surface (claim 20 and present Fig. 5) or the specific step of providing a sheetlike mask extending from the "top surface of said top layer" to the "encapsulant barrier" so that the sheetlike mask extends over the "encapsulation area" (present claim 22 and Figs. 1-3, 7 and 9).

For all of these reasons, the § 102 rejection should be withdrawn as to claim 1 and the other claims dependent thereon. With regard to the Examiner's comments at page 5 of the Official Action, it is again pointed out that interposer 36 and/or top layer 38 does not constitute the protective barrier referred to in claim 1 and nothing in Fig. 3 of Khandros discloses the step of "providing a protective barrier in contact with said top layer . . ." The teachings at column 17, lines 31-36 of Khandros mentioned in the Official Action refer to use of a mold which clamps "the waste areas 383 of the sheet or tape." Manifestly, waste areas 383 are located outwardly away from the other features of the semiconductor assembly, remote from the exposed terminals (see Fig. 10). To the extent that anything clamped to the "waste areas 383" limits the flow of encapsulants, such limitation merely prevents the

encapsulant from spreading outwardly away from the assembly. Further, the Examiner's comments alleging that it would be "within the expected skill of a worker in the art" to modify the reference so as to "position barriers and/or masks" in a manner not specified by Khandros '265 are believed to be legally incorrect in the context of a § 102 rejection. To the extent that one of ordinary skill would have to modify the reference by adding or moving elements "to accomplish this objective," the reference does not anticipate the claim.

Independent claim 41 is directed to a specific arrangement in which the encapsulant is provided as a solid preform (48, Figs. 10A -10C and 11) and present specification page 14 *et seq.* In this arrangement, the "preform" has "a predetermined volume which is equal to or less than the volume of said encapsulation area" (claim 41, lines 13-14). Thus, when the encapsulant preform is liquefied, the encapsulant does not tend to flow out of the encapsulation area onto the exposed terminals. Liquefaction of a solid preform to provide a liquid encapsulant has not been pointed out in Khandros '265. Further, the specific use of a solid preform having a volume less than the volume of the encapsulation area is not seen in this reference. Therefore, the § 102 rejection on Khandros '265 should be withdrawn as to claim 41 and as to claims 32-47 dependent thereon.

Additional claims were rejected under § 103 on Khandros '265 taken in view of various secondary references (Official Action, ¶¶ 3-7). Reconsideration and withdrawal of these rejections are respectfully requested for the reasons set forth above. Each of these rejections are explicitly based on use of Khandros '265 to disclose the basic features of the combination. In each case, the additional references are relied upon as teaching specific features recited in dependent claims. Nothing in the additional references has been relied upon by the Examiner as teaching anything pertaining to the features discussed above in connection with the § 102 rejection.

Claims 45-47 were rejected under 35 U.S.C. § 112, second paragraph. The Examiner's suggestion that claims 45-47 be modified to change "encapsulation" to -- encapsulant -- has been adopted and it is, therefore, believed that this rejection has been overcome.

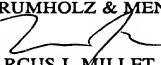
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The objection to the specification (Official Action, p. 10) is well taken. Reference numeral 29 referring to the surface of the can has been corrected to read -- 31 --. A revised set of proposed drawing corrections (red-marked prints) has been provided. These remedy the deficiencies set forth in paragraph 11 of the Official Action and amend Fig. 1 to use reference numeral 31 rather than 29 to denote the surface of the can.

As it is believed that all of the objections, rejections, and requirements set forth in the Official Action have been fully met by the foregoing amendments and remarks, favorable reconsideration and allowance of all claims in the application as amended are earnestly solicited.

Respectfully submitted,

LERNER, DAVID, LITTENBERG,
KRUMHOLZ & MENTLIK


MARCUS J. MILLET
Reg. No. 28,241

600 South Avenue West
Westfield, NJ 07090
Tel: (908) 654-5000;
Fax: (908) 654-7866
F:\SS\DOCS\3.0\77407.DOC